



# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Gas Turbine Engine Combustion Equipment

We, ROLLS-ROYCE LIMITED, a British company of Nightingale Road, Derby, Derbyshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns gas turbine engine combustion equipment.

According to the present invention, there is provided gas turbine engine combustion equipment comprising casing structure within which is mounted and from which is spaced a flame tube, and a plurality of angularly spaced apart nozzle guide vanes which are mounted immediately downstream of the flame tube, each of the nozzle guide vanes having its upstream end solely supported by the flame tube so as to move radially therewith.

Support means, connected to the casing structure, are preferably provided for supporting the downstream end of each nozzle guide vane in such a way as to permit the latter limited freedom of movement radially.

The support means may locate the nozzle guide vanes both axially and circumferentially.

The nozzle guide vanes are preferably provided with dogs which co-operate with dogs on the support means to prevent circumferential movement of the nozzle guide vanes. The nozzle guide vanes may have some freedom of movement axially with respect to the flame tube.

The invention also comprises a gas turbine engine provided with combustion equipment as set forth above.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:—

Figure 1 is a broken-away view, partly in section, of a gas turbine engine provided with combustion equipment according to the present invention, and

Figure 2 is a broken-away sectional view on a larger scale of part of the structure shown

in Figure 1.

A gas turbine engine 10 has an engine casing 14 within which is mounted, in flow series, a compressor 15, combustion equipment 16, a plurality of angularly spaced apart nozzle guide vanes 17, and a turbine 18. The turbine 18 drives the compressor 15 through a shaft (not shown).

The combustion equipment 16 comprises an annular flame tube 25 which is mounted within and spaced from the casing 14, an inner casing 26 being mounted inwardly of and spaced from the annular flame tube 25.

Each of the nozzle guide vanes 17, which are mounted immediately downstream of the flame tube 25, has a shroud 30 and a platform 31. The shroud 30 has a flange 32 at its upstream end which is received, with some freedom for axial movement, within an annular recess 33 in the outer wall 34 of the flame tube 25. The platform 31 has a portion 35 of increased area at its upstream end which is slidably mounted in a recess 36 at the downstream end of the inner wall 37 of the flame tube 25. This construction ensures that the upstream ends of the nozzle guide vanes 17 are supported solely by the flame tube 25 so as to move radially therewith, but that the nozzle guide vanes 17 are permitted some axial freedom on movement axially with respect to the flame tube 25.

The shroud 30 of each of the nozzle guide vanes 17 is provided at its downstream end with dogs 40. The dogs 40 are received between an annular wall member 41, which is secured to the casing 14, and an annular disc 42 which is secured to the wall member 41. The wall member 41 and disc 42 thus serve to locate the downstream ends of the nozzle guide vanes 17 axially but, as will be seen, the dogs 40 have some freedom of movement radially within a recess 43 defined between the parts 41, 42.

The wall member 41 is also provided with dogs (not shown) which co-operate with the

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dogs 40 so as to prevent circumferential movement of the nozzle guide vanes 17.

5 The platform 31 of each of the nozzle guide vanes 17 is provided with a flange 44 having dogs 45 which are located circumferentially between dogs (not shown) on a flange member 46 carried by the inner casing 26.

10 As will be appreciated, the nozzle guide vanes 17 will thus move radially with the flame tube 25 but will be located both axially and circumferentially at their downstream ends.

WHAT WE CLAIM IS:—

15 1. Gas turbine engine combustion equipment comprising casing, structure within which is mounted and from which is spaced a flame tube, and a plurality of angularly spaced apart nozzle guide vanes which are mounted immediately downstream of the flame tube, each of the nozzle guide vanes having its upstream end solely supported by the flame tube so as to move radially therewith.

20 2. Combustion equipment as claimed in claim 1 in which support means, connected to the casing structure, are provided for supporting the downstream end of each nozzle guide vane in such a way as to permit the latter limited freedom of movement radially.

3. Combustion equipment as claimed in

claim 2 in which the support means locate the nozzle guide vanes both axially and circumferentially. 30

4. Combustion equipment as claimed in claim 3 in which the nozzle guide vanes are provided provided with dogs which co-operate with dogs on the support means to prevent circumferential movement of the nozzle guide vanes. 35

5. Combustion equipment as claimed in any preceding claim in which the nozzle guide vanes have some freedom of movement axially with respect to the flame tube. 40

6. Combustion equipment as claimed in any preceding claim in which there is a single annular flame tube.

7. Gas turbine engine combustion equipment substantially as hereinbefore described with reference to and as shown in the accompanying drawings. 45

8. A gas turbine engine provided with combustion equipment as claimed in any preceding claim. 50

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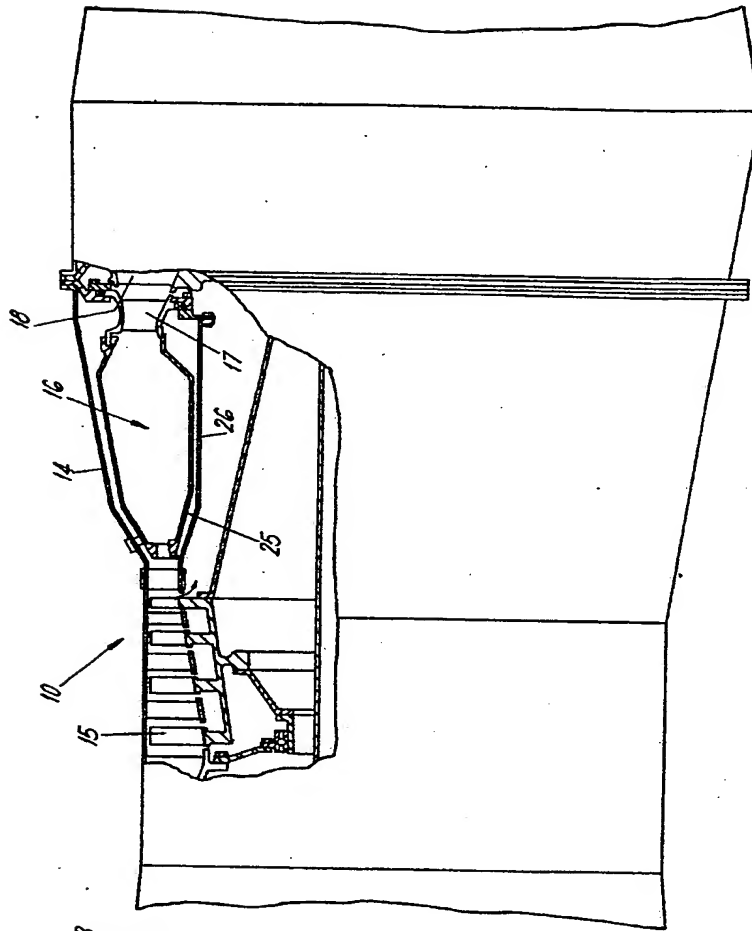


FIG. 1

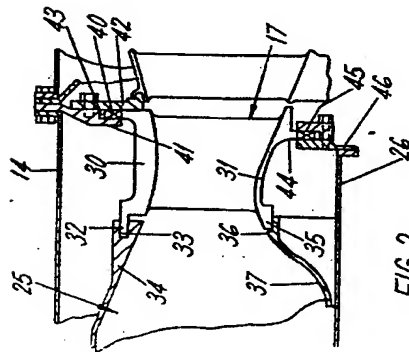


FIG. 2